Adapting technology to keep the national infrastructure safe and secure

September 1, 2013

There's just been a disaster and even local authorities are having trouble navigating because the once-familiar landmarks (buildings and even road signs) are nowhere to be seen. Thanks to the creative adaptation of Lab technology, the Department of Homeland Security's (DHS), Federal Emergency Management Agency (FEMA) and National Geospatial-Intelligence Agency may have a new tool to help responders locate critical facilities, blocked roads and heavily damaged areas to bring help and speed recovery.

In any emergency, time is of the essence, so use of existing resources makes more sense than creating new ones. Paul Pope, with the Lab's Space & Remote Sensing group, realized as he saw airborne TV news footage of the damage from the recent tornados in Moore, Oklahoma that he might have a technology to help precisely locate what part of the damaged city was being shown.

An issue with attempting to turn TV footage into a map is the unmatched angles of the images. (The helicopter news crews are rarely trying to get directly over the damage and shoot straight down, as is done when maps are laid out.) With approval from his management in the Global Security directorate and Space & Remote Sensing group (ISR-2), Pope used a frame grab of one of the disaster shots and set about to "flatten" or rectify the image so it could be projected onto a map showing a pre-disaster view of the area. Pope and his student, Luci Gaines, manually identified recognizable landmarks and made a comparison between the frame grab and the pre-disaster view to pinpoint what part of town was being shown. But Pope is working to automate this step to make location identification much quicker. The rectified images could then be uploaded to servers for access by all the agencies that might need them.

Pope has contacted the Lab's National Infrastructure & Analysis Center (NISAC), (which has a partner center at Sandia National Laboratory) to offer the damage assessment technology for future use. The Centers work closely with DHS to identify short- and long-term threats to infrastructure that could affect the nation's public safety, security and prosperity.

You can learn more about critical infrastructure security issues on DHS's website.

There's also more about DHS's use of the National Infrastructure Simulation and Analysis Center on its website.